California High-Speed Train Project

TECHNICAL MEMORANDUM

Design Variance Guidelines
TM 1.1.18

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Prepared by PB

for the California High-Speed Rail Authority

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ABSTRACT

This technical memorandum establishes a procedure for identifying, preparing, requesting, and documenting a design variance from design standards, standard drawings, specifications, adopted standards and design guidance established for the California High Speed Train Project (CHSTP). It is intended to provide clear guidance for preparing a clear and concise record of the relevant design standard, required variance and rationale, assessment, review and key decisions leading to the approval of the variance. This process is to be used through the Design and Delivery of the project.

The design variance request process is comprised of the following steps:

- Early identification of potential variances
- Preliminary investigation of variances
- Variance request preparation and documentation
- Variance review and analysis of potential impacts
- Approval or rejection of variance
- Communication of the approved variance to Authority and program management team
- Document control and feedback loop to design standards development

This technical memorandum also defines the roles and responsibilities associated with the requirements in requesting, approving and documenting the project's design variances.

This document includes forms for use in preparing, submitting and documenting design variance requests.

1.0 INTRODUCTION

1.1 PURPOSE

This memorandum provides background information, defines the requirements and establishes the procedure by which designers request and obtain approval to deviate from design criteria, standard drawings, specifications, adopted standards and design guidance established for the California High Speed Train Project (CHSTP).

This technical memorandum establishes a procedure for identifying, preparing, requesting, and documenting a design variance from a CHSTP Minimum design standard, standard drawings, specifications, adopted standards and design guidance established for the California High Speed Train Project (CHSTP). It is intended to provide clear guidance for preparing a clear and concise record of the relevant design standard, required variance and rationale, assessment, review and key decisions leading to the approval of the variance.

1.2 GENERAL

Applicability: CHSTP design criteria are typically classified using three terms: Desirable, Minimum, and Exceptional standards. Design Variances are required for design elements that do not meet Minimum/maximum criterion standards.

Justification: Typical justification for design variances could include avoidance of existing physical impediments or substantial environmental or economic impacts that would severely affect project cost and implementation. Such considerations may include existing residential, commercial or industrial establishments; costly right of way acquisition; concerns over safety and liability; noise and vibration impacts; adverse terrain, and environmental impacts.

Mitigation: Safety, maintenance, and operational issues and mitigation measures required to ensure safety for a proposed alternate design must be clearly identified where Minimum/Maximum standards are not met.

Request for variance from CHSTP design criteria should be considered in light of the CHSRA goal of providing safe and reliable high-speed intercity train operations. Variances to CHSTP criteria must be considered in keeping with this primary goal.

1.2.1 Definition of Terms

The following technical terms and acronyms used in this document are defined with regard to the California High Speed Train project.

Approve	Confirms the reviewer's approval with no exceptions taken. The variance advances according to procedure.
Approve with Recommended Modification	Variance reviewer confirms approving the proposed design variance and any exception taken is not considered critical. A critical exception often reveals that the proposal did not consider one or many possible situations, (ie. operating condition, construction consideration, schedule implication, etc.) that may bring significant impact to cost, schedule, safety or functionality. The reviewer *must* provide comments if selecting this vote option and recommendations to resolve the exception taken. Once modified, the revised variance will not be subjected to a full system-level review. Instead, it is advanced according to procedure after the revision is verified.
Change Control	The process by which significant changes occur to the project scope, schedule, budget, functionality, or location.
Desirable	Standard which shall be equalled or exceeded where there are no constraints on the design.

Exceptional	Standard which shall be achieved only where Minimum standards are practicably unobtainable. Where Minimum standards are not obtainable, the Exceptional Standards must absolutely be met based upon an approved design variance with adequate analysis and justifications.
Minimum/Maximum	Standard which shall be equalled or exceeded where constraints on alignment make use of Desirable standards impractical or significantly more expensive than if Minimum standards are used. Where Desirable standards are not obtainable, the Desirable shall be approached as nearly as practical.
Non-Standard	Design Feature that does not meet Minimum criteria.
Rejected	Confirms the reviewer's disapproval of most or all aspects of the proposed design variance. The Variance is returned to its originator.
Resubmit with Recommended Modification	The variance reviewer does not agree with the proposed variance as is. The reviewer must provide comments that reveal one or many critical exceptions. A critical exception demonstrates that the proposed design variance does not consider that an approval of the variance, as is, would have one or several significant impacts to cost, schedule, safety, or functionality. The variance reviewer *must* also provide recommendations to resolve any exceptions taken. This option involves another review cycle after revision of the design variance by all reviewers that voted "resubmit." Once approved, the vote will be changed to 'Approve' and the variance will advance according to procedure.
Variance	Approved deviation, or exception, from a CHSTP Minimum design criteria or Minimum design standard.

Acronyms

AREMA	American Railway Engineering and Maintenance of Way Association
Authority	California High-Speed Rail Authority
CCB	Change Control Board
CFR	Code of Federal Regulations
CHSTP	California High-Speed Train Project
CPUC	California Public Utilities Commission
DPM	Designers Project Manager
EM	Engineering Manager
FRA	Federal Railroad Administration
GO	General Order
RC	Regional Consultant
RM	Regional Manager
RE	Regional Engineer

1.2.2 Units

The California High-Speed Train Project (CHSTP) is based on U.S. Customary Units consistent with guidelines prepared by the California Department of Transportation (Caltrans) and defined by the National Institute of Standards and Technology (NIST). U.S. Customary Units are officially used in the U.S. and are also known in the U.S. as "English" or "Imperial" units. In order to avoid confusion, all formal references to units of measure should be made in terms of U.S. Customary Units.

2.0 DEFINITION OF TECHNICAL TOPIC

2.1 GENERAL

Design standards for the CHSTP are under development. Initial design standards will be issued by the PMT as technical memoranda that contain information and/or procedures for project-specific design or technical elements. Additionally, directive drawings and standard drawings will be issued by the PMT that establish design standards for CHSTP.

In the case of differing values, conflicts in the various design requirements, or discrepancies in the application of design guidelines, the standard followed shall be that which results in the highest level of satisfaction for all requirements. In the unlikely possibility that the design in question does not fall under the jurisdiction of any referenced standard, the most appropriate requirement or standard will be established by the California High-Speed Rail Authority (CHSRA). All standards shall be followed as required to ensure public safety and to secure regulatory approvals.

Where applicable, the basis of design will follow the guidelines described in the CHSTP Design Manual. These design standards were developed specifically for the construction and operation of high-speed railways and are based on international best practices. Additionally, local building, planning and zoning codes and standards must be met.

2.2 LAWS AND CODES

Criteria for design elements not specific to HST operations will be governed by existing applicable standards, laws and codes. Applicable local building, planning and zoning codes and laws are to be reviewed for the stations, particularly those located within multiple municipal jurisdictions, state rights-of-way, and/or unincorporated jurisdictions.

In the case of differing values, the standard followed shall be that which results in the satisfaction of all applicable requirements. In the case of conflicts, documentation for the conflicting standard is to be prepared and approval is to be secured as required by the affected agency for which an exception is required, whether it be an exception to the CHSTP standards or another agency standards.

3.0 ASSESSMENT / ANALYSIS

3.1 DESIGN VARIANCE REQUEST PROCESS DURING PRELIMINARY ENGINEERING

The design variance request process is comprised of the following steps:

- Early identification of potential variances
- Preliminary assessment of variances to confirm feasibility and identify potential mitigations
- Variance request preparation and documentation
- Variance review and analysis of potential impacts
- Approval or rejection of variance
- Distribution or publication of the approved variance to all program design and management teams
- Document control and feedback loop to design standards development

See the Design Variance Process Diagram further in this section.

3.1.1 Early Identification of Potential Variances

The Regional Consultant (RC) shall identify non-standard design elements that require variances early in the design process and submit an inventory of non-standard design elements to the RM. If the RM agrees that a potential variance warrants consideration, the RC shall investigate the feasibility of alternate design solutions and assess the implications associated with the potential design exception.

3.1.2 Preliminary Investigation of Variances

The initial investigation shall include the identification of all CHSTP systems, safety, operations and maintenance factors, in terms of affected scope, cost, and schedule by introducing a design that does not achieve the Minimum standard. Affected systems include but are not limited to engineering, train operations, maintenance, right of way, cost considerations, financial impacts to businesses and industry (including railroads), traffic impacts, and other physical impediments such as natural terrain and issues related to environmental concerns.

The specific location(s) where a potential design variance would be introduced shall be clearly identified as part of the initial investigation.

Early identification and discussion with the RM regarding the design variance is recommended, particularly where the design concept and/or cost estimate is dependent on the design variance. When a design variance has substantive impact to the cost estimate, a range order of magnitude estimate must be produced and presented to the RM with the design variance proposal.

3.1.3 Variance Request Preparation and Documentation

The initiator of the design variance may originate from the RC, Authority, PMT, or third party. The RC (and third party designers in some cases) is responsible for preparing the documentation for each design variance request. In this documentation, the RC expands on the initial investigation, prepares appropriate qualitative and/or quantitative analysis of the impact of the variance and initiates coordination with affected parties. The assessment may include a recommendation as to the course of action.

The RC is required to complete a Design Variance Request Form that summarizes essential information regarding the design variance. The submittal of the Design Variance Request Form shall include all relevant supporting documentation.

The RC is required to address all comments from the PMT variance review of potential impacts. Any modifications to the variance must be reflected throughout the standard submittal forms and clearly marked as a new revision. New revisions shall be submitted formally to advance in this procedure.

Further instruction and required documentation requirements are detailed below.

3.1.4 Variance Review and Assessment of Potential Impacts

The RM and PMT will review draft variance request documentation and return comments for resolution. Only those non-standard design elements that were previously identified and reviewed by the RM, submitted to the EMT, and resolved all critical comments shall proceed to the stage of a formal request for approval. The RM and PMT review process is to be completed on a timely basis to keep the program on schedule. A response to the variance requestor is required within twenty (20) working days.

Note: If the same design exception occurs in multiple locations, one Design Variance Request may be submitted for multiple locations with the recurring locations identified if the justification and mitigations are identical. Each variance will have unique identifiers and will reference the same design criteria sections. If more than one criterion is exceeded, all criteria must be identified as separate variance requests.

Non-standard features identified after the approval of a design variance may require preparation of an amendment to the original Design Variance Request or submittal of a new Design Variance Request for approval.

3.1.4.1 Obtaining Required Regulatory Approvals for Variances to CFR

All design variance requests shall meet applicable CRF regulations. The Federal Railroad Administration (FRA) will be informed of design variances that impact the program's regulatory requirements.

3.1.5 Approval or Rejection of Variance

The following flow chart demonstrates the process by which an appropriate design variance becomes approved. To keep this process efficient and timely, a draft design variance should have only two (2) review/comment cycles before being submitted as final to the CHSTA and regulatory authorities.

Some design variance requests will require revisions by the originator. These changes must be made to address all review comments and then resubmitted with a new revision number in the request title.

During technical review, the design variance will be voted upon by each subsystem and regional team reviewer. The voting options are as follows:

- Approve
- Approve with Recommended Modification
- Rejected
- Resubmit with Recommended Modification

Approve. Confirms the reviewer's approval with no exceptions taken. The variance advances according to procedure.

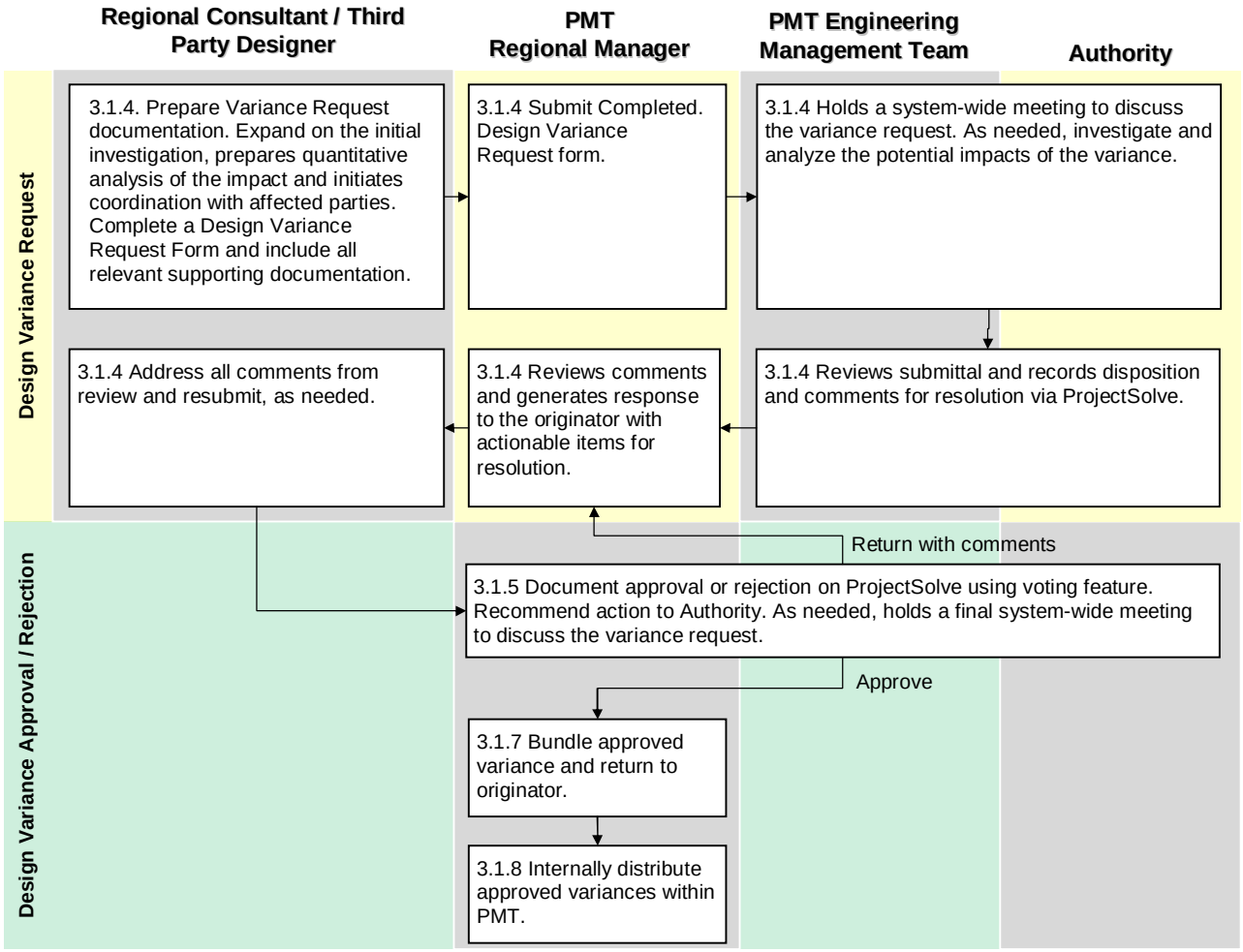
Approved with Recommended Modification. Variance reviewer confirms approval of the proposed design variance and any exception taken is not considered critical. A critical exception often reveals that the proposal did not consider one or more possible situations, (i.e., operating condition, construction consideration, schedule implication, etc.) that may bring significant impact to cost, schedule, safety or functionality. The reviewer must provide comments if selecting this vote option and recommendations to resolve the exception taken. Once modified, the revised variance will not be subjected to a full system-level review. Instead, it is advanced according to procedure after the revision is verified by the reviewer identifying the need for modification.

Resubmit with Recommended Modifications. The variance reviewer does not agree with the proposed variance as transmitted. The reviewer must provide comments that identify one or many critical exceptions. A critical exception demonstrates that the proposed design variance does not consider that an approval of the variance, as is, would have one or several significant impacts to cost, schedule, safety, or functionality. The reviewer must also provide recommendations to resolve any exceptions taken. This option involves another review cycle after revision of the design variance by all reviewers that voted "resubmit." Once approved, the vote will be changed to 'Approve' and the variance will advance according to procedure.

Understanding that this voting process may still leave room for interpretation, The RM and the PMT will work collaboratively and quickly to reach consensus, The RM is responsible for ensuring that an audit trail is kept and the program moves forward.

Rejected. Confirms the reviewer's disapproval of the proposed design variance. The Variance is returned to its originator with comments explaining reason for disapproval.

3.1.6 Design Variance Process Diagram



* A history of each design variance and their related meetings, action items, correspondence, and approvals will be recorded to a ProjectSolve database by the Project Configuration Manager.

3.1.7 Change Control Requests and Design Variances

For design variance requests with significant impact to the overall program scope, schedule, and/or budget, these design variances must follow an additional approval by the Change Control Board (CCB) which is established by the Program Change Control Procedure. According to the Change Control Procedure, all changes that impact the CHSTP baseline documents must be approved by the CCB, including approved design variances with significant impact to scope, schedule, cost, or functionality. These unique design variances will be brought to the CCB for approval after they are approved by the PMT. All submittal requirements for this process are outlined in the Change Control Procedure.

3.1.8 Distribution of Approved Variance to All Program Design and Management Teams

All approved design variance requests will be stored on the ProjectSolve system. Approved variances will be archived within a database for official record. Email notifications of formal approvals and links to the approved variances will be distributed to the RC, RM, PMT, and all

relevant agencies and authorities. The RC is expected to include and implement all approved design variances when progressing design development.

A concise monthly log that tracks all approved and pending design variances will also be distributed by the PMT to keep all relevant members of the CHSTP updated and informed. This log will be located on ProjectSolve and updated and circulated monthly.

3.1.9 Document Control and Feedback to Design Standards Development

ProjectSolve software allows for all review comments and authorizations to be documented and archived. ProjectSolve will provide document control as well as an audit trail history for the decisions made and rationale behind each design variance. Should duplicate design variance requests or amendments to approved design variances arise, ProjectSolve as well as the monthly design variance log shall provide the history that prevents any rework.

As design variances are approved, the approval notifications from ProjectSolve will be distributed to the PMT to trigger feedback which may update critical design documents for the CHSTP. These documents include but are not limited to:

Design Requirement Documents

- Contract General Provisions
- Contract Special Provisions
- Design Manual
- Interface documents

Design Drawings

- Affected Design Drawings
- Directive Drawings
- Standard Drawings

Program Management Documents

- Design Variance Status Log
- Construction Cost Estimate
- Construction Schedule
- System Safety Plan
- CHSTP Risk Register
- Systems Interface Manual

Timely circulation of these design variances will allow for a high level of coordination between the RM and PMT as well as the regional design teams.

3.1.10 Validation & Verification

Documented design variances will also support the implementation of the Validation and Verification (V&V) process. When verifying the design-build contractor's conformance to the project's established criteria, the PMT staff responsible for V&V will utilize all archived variances as backup documentation to address potential disconnects that arise from identified deviations as part of the V&V process.

3.1.11 Design Variance Request Process during Final Design

To follow.

3.1.12 Design Variance Request Process during Construction

To follow.

3.2 ROLES AND RESPONSIBILITIES

Responsibilities defined in this section will be performed by a person in responsible charge.

RC

- Application of appropriate design standards
- Early identification of non-standard design features
- Communication of non-standard design elements to the RM
- Assessment of impacted interfaces
- Assessment of alternative design solutions or appropriate mitigations
- Assessment of related prior design variance approvals, if any.
- Coordination with stakeholder, permitting, operating, and other affected agencies
- Determination of sufficient justification to warrant a variance
- Preparation and transmittal of the Design Variance Request to RM / PMT
- Response and resolution to review comments from RM / PMT
- Preparation and transmittal of required documentation
- Design variance implementation

PMT / RM

- Identification of non-standard design features
- Standardization of Design Variance Request Form
- Review of the design variance request
- Discussion of variance with CHSRA staff, as appropriate
- Provide review comments to RC
- Approval of design variance requests
- Distribution of design variance approvals and monthly status log
- Coordination of design variance impacts to design documents
- Coordination with impacted program functions (ie. risk, project controls)
- Archival of appropriate documentation
- Final closeout to ensure all approved design variances were implemented in Record sets

3.3 DOCUMENTATION

The RC shall prepare the documentation for each design variance request.

3.3.1 Design Variance Request Form

The Design Variance Request Form is a standard form issued by the PMT/RM to be utilized across all project segments. When the form is initially processed as draft and then formally submitted as final, the Design Variance Request shall include the date of both draft and final versions of the Request, the number of the Request (generated in a sequential manner), name of the originator requesting, name of contract, contract number, the specific variance requested and why, a clear reference or link to the design criteria, the major design elements (i.e., rail, structures, right of way, utility, environmental) that may be impacted and supporting documentation.

3.3.2 Required Data

Each Design Variance Request shall include the following information:

- Identification of variance with regard to the Minimum standard and its relevance to the Desirable standard. (No variances may be requested against the Exceptional Standards.)
- Description of the specific design element and the applicable criteria, i.e. General Criteria, Standard Drawing, Specification or Minimum Design Standard.
- Rationale and justification for the request and the location(s and/or length) where the variance may be applied.

- Seal and signature of an engineer licensed in California.

For an example of the necessary level of data in a Design Variance Request, see Appendix 7.3 for a completed sample Design Variance request for use as reference.

3.3.3 Supporting Documentation

The RC shall provide appropriate and specific documentation to allow review, assessment, concurrence and approval of the Design Variance Request. In addition to the Design Variance Request, additional information may consist of but is not limited to:

- Supporting drawings, and/or details
- Calculations, risk and cost factors and corresponding mitigations
- Other impacts: environmental, constructability, etc.
- Recommendation on proper documentation of the variance in the contract procurement documents

For examples of supporting documentation, see Appendix 7.3 for a completed sample Design Variance request for use as reference.

3.3.4 Document Control

- Design variances must be approved prior to transmittal of Preliminary design documents.
- Approval documentation to be filed in the CHSRA files.
- RC to maintain a copy of approved Design Variance Request in the project files.
- RC to incorporate how best to communicate the existence of the design variances to the potential bidders in the construction / design-build contract documents. The RC must include this aspect in their QA/QC procedures.
- RC to communicate any restrictions to the PMT / RM and CHSRA.

4.0 SUMMARY AND RECOMMENDATIONS

4.1 DESIGN VARIANCE REQUEST GUIDELINES

The following section outlines the identification, assessment and approval of requests for Design Variances for design elements that do not achieve the Minimum design standards of the CHSTP.

4.2 DRAFT DESIGN VARIANCE REQUEST

The following are guidelines for preparing the Draft Design Variance Request. This section should be completed and transmitted to the RM for review and approval as early as practical.

Design Overview

Provide a brief overview of the design element under consideration and the applicable standard. The type and location of the feature should be referenced, as appropriate, to clearly identify the location and limits.

4.3 DESIGN VARIANCE REQUEST

The following section lists the guidelines for preparing a Design Variance Request. This information shall be completed following review and approval by the RM.

Design Details

If required, provide any clarification and or correction to the information included in the Draft Design Variance Request. Revisions should be minor in nature, such as refinement of the limits of the non-standard design element.

Features Requiring an Exception

A. Non-standard Features:

Describe the proposed non-standard feature(s) and reference plans, typical sections and/or sketches. If several non-standard features are proposed, reference a table summarizing the location and nature of the non-standard elements.

B. Standard for Which Variance Is Requested:

Reference the CHSTP Design Manual Section, Topic and Tables that apply. It is not necessary to restate the entire design standard; only state the portion that applies to the exception request

C. Reason for Requesting Variance:

Avoid open-ended statements. Clearly explain why the standards cannot be followed and what measures, if any, could be taken to mitigate impacts.

- Limitations in project scope are generally not appropriate reasons for exception from a design standard.
- The cost of providing a full standard design may be a supportive factor for approving a non-standard feature, particularly if this cost is generated by an impact such as right of way purchases or environmental mitigation.
- Project schedule should not typically be used as a reason to justify a non-standard feature but can be used as a supportive factor in terms of delay of benefits.

D. Potential Mitigations:

Identify potential and reasonable mitigations to maintain or improve performance or operations. Commitments to implementing potential mitigations are generally not appropriate for inclusion. Mitigations may be an operational rule, such as a speed restriction at the location of the non-standard feature. The Design Variance Request process is specifically established for “design” features and not exceptions to either operations or maintenance standards. If an operational or maintenance procedure is the resulting mitigation for the design variance, this operational restriction has to be

automatically included into the operations and maintenance procedures and contract documents.

E. Requirements/Estimated Cost to Make Standard:

Provide a reasonable cost estimate summary required to achieve desirable and minimum standards for each element for which an exception is requested. Costs should be presented by major cost elements (i.e., rail, structures, right of way, utility, environmental).

Reviews

List the people/agencies that have reviewed and commented on the design exception. Include his/her title, the design exception he/she reviewed and the date of review or concurrence.

A completed Design Variance Cover Sheet should accompany the final variance request. A Design Variance Cover Sheet template is included in Section 6.4.

Form

Design Variance Request Form is a stand-alone document and must contain exhibits and drawings that show proposed non-standard features.

Design Variance Request Form template is included in Sections 6.5.

5.0 SOURCE INFORMATION AND REFERENCES

1. Manual for Railway Engineering of the American Railway Engineering and Maintenance of Way Association (AREMA Manual)
2. Federal Railroad Administration Code of Federal Regulations (CFR)
3. California Department of Transportation, Manuals and Standards, in particular the following documents:
   - Highway Design Manual, Chapter 80: Application of Design Standards (September 1, 2006)
   - Project Development Procedures Manual, Chapter 21: Exceptions to Design Standards (July 1, 1999)
4. California Public Utilities Commission General Orders
5. CHSTP Change Control Procedure

6.0 DESIGN MANUAL CRITERIA

None Applicable

APPENDIX A

See attached reference document, filename: TM 1.1.18 CHSTP Design Variance Form Appendix A.pdf

California High-Speed Train Project

DESIGN VARIANCE COVER SHEET

Design Variance Request Number

Design Variance Request Title

Prepared by:

_____ _____
Regional Consultant Date

PMT Review:

_____ _____
Systems Date

_____ _____
Infrastructure Date

_____ _____
Operations/Maintenance/Safety Date

_____ _____
Rolling Stock Date

_____ _____
System Integration Date

PMT Recommended:

_____ _____
PMT Regional Manager Date

PMT Approval:

_____ _____
Engineering Manager Date

Agency Concurrence:

_____ _____
CHSR Authority Chief Engineer Date

CHST Design Variance Request Form

Part 1 – Design Variance Request Information

Title/Subject:

Number: ABC-DEF-X-0001* **Revision: X***

Contract Name & Number (Final Design):

Region:

Location:

Regional Consultant's / Third Party Design Drawing Reference:

Date Submitted to RMT & PMT

PREPARED / SUBMITTED BY: NAME: COMPANY: SIGNATURE: DATE: (MM/DD/YY)	(Engineering Seal)

*****_Note design variance numbers will follow the same convention:_ "ABC" will abbreviate the name of the firm submitting the variance, "DEF" abbreviates the name of firm receiving the variance request, "X" is the revision number starting from 0, and the last four numbers count the number of total submittals starting from one.

Part 2 – Design Variance Request Information

CHSTP DESIGN REQUIREMENT Include reference to drawings, design criteria, technical memos, specifications	
DESIGN CRITERIA REQUIRING A VARIANCE	
REASON FOR REQUESTING VARIANCE	
JUSTIFICATION FOR VARIANCE	
PROPOSED ALTERNATIVE DESIGN REQUIREMENT	

Part 3 – Impact Analysis

OPERATIONS	
MAINTENANCE	
INFRASTRUCTURE	
RAILROAD SYSTEMS	
RELIABILITY / FUNCTIONALITY	
THIRD PARTY (Utility, Freight, Caltrans, RR, other)	
SAFETY AND SECURITY	
DIRECT COST	
OTHER	

Part 4 – Mitigation Measures

Part 5 – List of Supporting Documentation to Design Variance Request

ANALYSIS	
PUBLICATION/STANDARDS EXTRACTS	
RISK ASSESSMENT	
DRAWINGS	
CALCULATIONS	
EXPERT TESTIMONIALS	
CORRESPONDENCE	
OTHER	

Do not attach superfluous materials, such as complete project plan sets or engineering reports unless specifically requested.

APPENDIX B

See attached reference document, filename: TM 1.1.18 CHSTP Sample DVR Appendix B.pdf

Sample Design Variance Request Form and Support Documentation for Information Only

California High-Speed Train Project

DESIGN VARIANCE COVER SHEET

Design Variance Request Number

Design Variance Request Title

Prepared by:

_____ _____
Regional Consultant Date

PMT Review:

_____ _____
Systems Date

_____ _____
Infrastructure Date

_____ _____
Operations/Maintenance/Safety Date

_____ _____
Rolling Stock Date

_____ _____
System Integration Date

PMT Recommended:

_____ _____
PMT Regional Manager Date

PMT Approval:

_____ _____
Engineering Manager Date

Agency Concurrence:

_____ _____
CHSR Authority Chief Engineer Date

CHST DESIGN VARIANCE REQUEST FORM

Part 1 – Design Variance Request Information

Title/Subject:

Number: ABC-DEF-X-0001* **Revision: X***

Contract Name & Number (Final Design):

Region:

Location:

Regional Consultant's / Third Party Design Drawing Reference:

Date Submitted to RMT & PMT

PREPARED / SUBMITTED BY: NAME: COMPANY: SIGNATURE: DATE: (MM/DD/YY)	(Engineering Seal)

*****_Note design variance numbers will follow the same convention:_ "ABC" will abbreviate the name of the firm submitting the variance, "DEF" abbreviates the name of firm receiving the variance request, "X" is the revision number starting from 0, and the last four numbers count the number of total submittals starting from one.

Part 2 – Design Variance Request Information

CHSTP DESIGN REQUIREMENT Include reference to drawings, design criteria, technical memos, specifications	
DESIGN CRITERIA REQUIRING A VARIANCE	
REASON FOR REQUESTING VARIANCE	
JUSTIFICATION FOR VARIANCE	
PROPOSED ALTERNATIVE DESIGN REQUIREMENT	

Part 3 – Impact Analysis

OPERATIONS	
MAINTENANCE	
INFRASTRUCTURE	
RAILROAD SYSTEMS	
RELIABILITY / FUNCTIONALITY	
THIRD PARTY (Utility, Freight, Caltrans, RR, other)	
SAFETY AND SECURITY	
DIRECT COST	
OTHER	

Part 4 – Mitigation Measures

Part 5 – List of Supporting Documentation to Design Variance Request

ANALYSIS	
PUBLICATION/STANDARDS EXTRACTS	
RISK ASSESSMENT	
DRAWINGS	
CALCULATIONS	
EXPERT TESTIMONIALS	
CORRESPONDENCE	
OTHER	

Do not attach superfluous materials, such as complete project plan sets or engineering reports unless specifically requested.

CALIFORNIA HIGH-SPEED TRAIN PROJECT
DESIGN VARIANCE REQUEST

PART 1 – DESIGN VARIANCE REQUEST INFORMATION

Title / Subject: Horizontal Alignment, Platform Approach Tangent Length

Number: TJPA/INFRA/0/0005 - 0 **Revision:** 0

Contract Name and Number (Final Design): Transbay Joint Powers Authority

Region: San Francisco to San Jose Section Subsection 0, Transbay Transit Center Program

Location: Transbay Transit Center Program

Regional Consultant's / 3RD Party Design Drawing Reference:

TR – 3004 – Track Plan and Profile, STA 141+00 to STA 150+50 (refer to the sheet at the end of this document)

Date Submitted to RMT: February 1, 2011

PREPARED / SUBMITTED BY: Name: Brian Dykes, Principal Engineer Company: Transbay Joint Powers Authority Signature: B. R. Dykes Date (MM/DD/YY): 02/01/2011	REGISTERED PROFESSIONAL ENGINEER BRIAN R. DYKES C 34582 Exp 9/30/11 CIVIL STATE OF CALIFORNIA

PART 2 – DESIGN VARIANCE REQUEST

CHSTP DOCUMENT REFERENCE	(Include Document Title, Revision and applicable Section / Table / Paragraph Reference)
SYS. REQ.:	N/A
DIR. DWGS.:	N/A
TECH. MEMO.:	TM 2.1.3, Turnouts and Station Tracks TM 2.2.4, Station Platform Geometric Design
DESIGN MANUAL:	N/A
STD. DWGS.:	N/A
STD. SPECS.:	N/A
CHSTP DESIGN REQUIREMENT	TM 2.1.3, Section 6.1.4 – Low and Medium Speed Turnouts, states: "Number 11 turnouts shall be used as the standard yard turnout, and as the minimum size turnout to be installed in main tracks with speeds of 125 mph or less and in station tracks." Table 6.1.4 correspondingly identifies the minimum horizontal radius associated with the Number 11 turnout as 950 feet. However, no criteria for minimum track alignment horizontal curve radius is provided, and TM 2.1.3 appears to be directed to in-line high-speed stations, and track turnouts do not specifically address minimum track horizontal curvature.

	TM 2.1.8, Section 6.1.1, Track Alignment Design Parameter – Access and Main Line Connecting Tracks; Main Line Connecting Tracks, states: "Minimum Radius is as follows: Desirable: 2,500 feet, Minimum: 900 feet and Exceptional: 500 feet." The Downtown Rail Extension (DTX) tracks are similar to secondary mainline tracks and will be designed to minimize clearance times to and from the station platforms.
DESIGN CRITERIA REQUIRING A VARIANCE	Horizontal Alignment, Platform Approach Tangent Length TM 2.2.4 Section 3.2.1, Horizontal Alignment, has yet to be published. It is expected that this TM will include specific requirements for platform approach tangent length at terminal stations as indicated above. TM 2.1.3 Section 6.1.3, Station Connection Tracks, and Figure 6.1.4 indicate that a 75-foot to 85-foot length should be provided between the end of an intermediate platform and the start of any approach turnouts.
REASON FOR REQUESTING VARIANCE	The proposed Transbay Transit Center will be located on the site of the former Transbay Terminal in downtown San Francisco. The alignment of the DTX tunnel, which will feed rail traffic to and from the Transit Center, is primarily located within City-owned right-of-way, under Second and Townsend streets. The Transit Center location and rail alignment have been developed to minimize adjacent property impacts and subsequent right-of-way acquisition. The TJPA has worked cooperatively with the California High-Speed Train Project (CHSTP) to develop a Transit Center configuration that best meets the design requirements of CHSTP (see appendixes B and C). However, in order to maximize the available tangent platform length at the Transit Center and maintain the approach trackwork within Second Street, the TJPA requests that the requirement to provide 75 feet of additional tangent track on the approach to the Transit Center platforms be waived.
JUSTIFICATION FOR VARIANCE	Because of right-of-way constraints adjacent to the alignment and at the location of the Transit Center, accommodating the tangent approach criteria will result in significant additional right-of-way acquisition at considerable expense, or conversely in a reduced platform length. In its correspondence of August 27, 2010, California High-Speed Rail Authority (CHSRA) states, "in the absence of tangent, we assessed that platform tapers are required." (See Appendix B) Correspondingly, the TJPA has provided localized tapered platform edges at the west end of THE Transit Center to mitigate any rolling stock–platform contact arising from car swing. The request for approval of the platform taper at the Transit Center was submitted as design variance request TJPA/INFRA/0/0003 - 0, Platform Taper. Because the Transit Center is a terminal rail station, clearance is not required for exiting the platform on the east end. Therefore, the requirement for 75 feet of tangent track at the east end of the platform is not required.
PROPOSED ALTERNATIVE DESIGN REQUIREMENT	The TJPA requests that the platform approach tangent track requirements of TM 2.2.4, as they may be, and TM 2.1.3 be waived at the Transbay Transit Center.

PART 3 – IMPACT ANALYSIS

RELIABILITY / AVAILABILITY	There is no determined impact on the reliability, availability, maintainability, and safe operation of the high-speed train arising from this design criteria variance request.
ENVIRONMENTAL	See Cost Impacts.
ROW / EASEMENT	See Cost Impacts.
3RD PARTY	See Cost Impacts and Mitigation Measures.
OPERATIONAL	There are no additional operations and maintenance impacts arising from this variance request. For impacts associated with platform taper and platform gap, refer to design variance requests TJPA/INFRA/0/0003 - 0, Platform Taper, and TJPA/INFRA/0/0004 - 0, Platform Gap, respectively.
MAINTENANCE	See Operational Impacts.
INFRASTRUCTURE	No impact to CHSTP as provided under the Transit Center project that is sponsored by the TJPA.
SYSTEMS	No impact to CHSTP as provided under the DTX project that is sponsored by the TJPA.
COST DIRECT 3RD PARTY	Accommodating the CHSTP criteria for platform approach tangent length would result in the approach tracks and structures conflicting with a significant number of properties to the west of Second Street, between approximate limits of Howard Street and the Interstate 80 Bay Bridge approach. Properties affected include: a. 182 Second Street. This building is designated in San Francisco Planning Code Article 11 as contributing to the New Montgomery–Second Street Conservation District and the Second and Howard Streets District, designated on the National Register of Historic Places. b. 222 Second Street, a proposed 35-story office building. c. 246 Second Street, a 15-story residential tower. d. 400 Second Street, a 5-story commercial building. e. 611 Folsom Street, a 19-story commercial building. This building is the central San Francisco offices of AT&T, a primary communications distribution center. AT&T has previously indicated in conversations with the TJPA that relocating its conduit facilities in Second Street alone would take approximately 10 years. f. 631 Folsom Street, the recently constructed Blu condominium building, a 21-story residential structure. g. 600 Harrison Street, a 6-story commercial building. Based on work previously undertaken to review potential CHSTP alignments on Third and Seventh streets, the environmental impacts associated with acquiring the additional properties would be significant, and the cost of acquiring this substantial number of properties would be prohibitive. Acquisition costs for the above-listed properties are anticipated to be about $450 million. Approximate order of magnitude costs for the additional property acquisition are included in Appendix A.
DESIGN SCHEDULE	Transit Center Project 100% Construction Documents submittal is due 8/17/11.

PART 4 – MITIGATION MEASURES

Refer to design variance requests CHST-DCVR-TC003, Platform Taper, and CHST-DCVR-TC004, Platform Gap.

PART 5 - LIST OF SUPPORTING DOCUMENTATION TO DESIGN VARIANCE REQUEST

ANALYSIS	Appendix A — Additional right-of-way costs associated with accommodating CHSTP criteria for platform approach tangent length.
PUBLICATION / STANDARDS EXTRACTS	N/A
REPORTS	N/A
RISK ASSESSMENT	The TJPA has requested the use of a minimum track horizontal radius of 650 ft for the approach curvature to the Transbay Transit Center station in San Francisco, CA, due to constrained site conditions. The design will incorporate the use of head-hardened rails to reduce maintenance requirements. Other mitigating measures, as appropriate, may be incorporated at a later date.
DRAWINGS	Appendix C — Agreed Transbay Transit Center configuration
CALCULATIONS	N/A
EXPERT TESTIMONIALS	N/A
CORRESPONDENCE	Appendix B — Operator acceptance of Transbay Transit Center configuration: a. Minutes of TJPA–CHSTP Peninsula Rail Program (PRP) meeting of 8-27-10 indicating CHSTP and PRP acceptance of the use of a 650-foot minimum radius b. CHSTP and PRP letters to the TJPA dated 8-27-10 and 9-29-10, respectively, confirming agreement of the Transit Center configuration

PART 6 – 3RD PARTY REVIEWER LISTING AND THEIR ASSOCIATED COMMENTS

3RD PARTY NAME	3RD PARTY AFFILIATION	COMMENTS
N/A	N/A	N/A

Appendix A

Additional Right of Way Costs Associated with Accommodating CHSTP Criteria for Platform Approach Tangent Length

Properties not currently identified for acquisition which would be impacted by accommodating CHSTP criteria for platform approach tangent length are indicated in Figure 1 below. Costs associated with the acquisition of these properties and the relocation of owners is provided in Table 1.

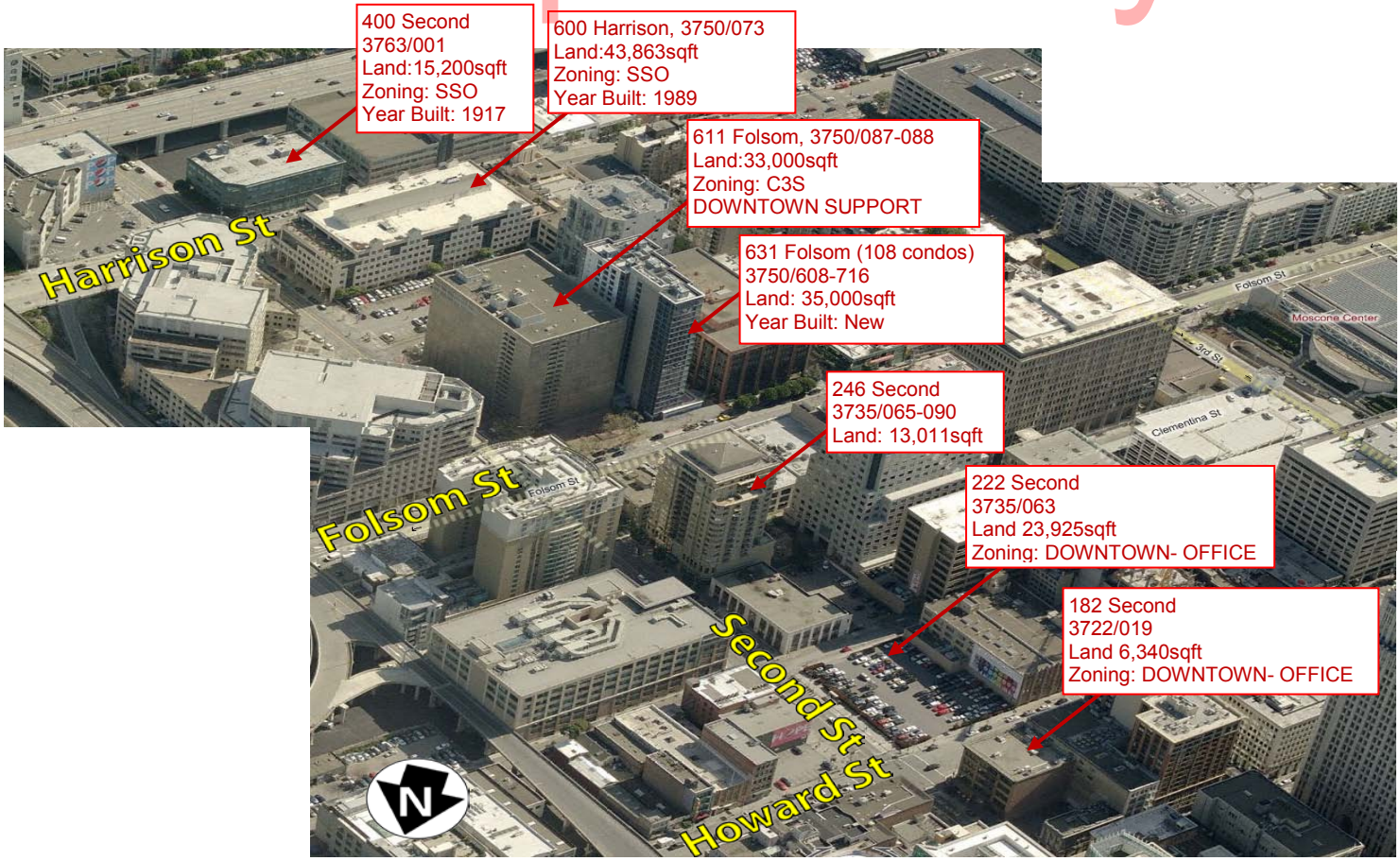


Figure 1: Additional Property Impacts, Second Street

Table 1: Right-of-Way Costs for Impacted Properties

	Block	Lot	Address	Lot Area (sq ft)	Floors	Gross Area (sq ft)	Property Value	$/sq ft	Relocation Assistance (3)	Total
a	3735	63	222 Second	23,925	35	837,375	$40,000,000	$47.77	$20,000.00	$40,020,000
b	3735	065-090	246 Second	13,011	15	220,000	$48,000,000	$218.18	$736,000.00	$48,736,000
c	3763	1	400 Second	15,200	5	76,000	$13,500,000	$177.63	$225,000.00	$13,725,000
d	3750	087-088	611 Folsom (2)	33,000	19	627,000	$52,000,000	$82.93	$1,880,000.00	$53,880,000
e	3750	608-716	631 Folsom	35,337	21	742,077	$115,000,000	$154.97	$1,620,000.00	$116,620,000
	3750	(see 631 Folsom)	282 Second	4,129	4		*(see 631)*			
f	3750	73	600 Harrison	43,862	6	263,172	$65,000,000	$246.99	$790,000.00	$65,790,000
g	3722	19	182 Second	6,340	5	31,700	$7,925,000	$250.00	$132,083.33	$8,057,083
						2,797,324	**$341,425,000**	$122.05	**$5,403,083**	**$346,828,083**
									30% Contingency (1)	$100,000,000
										$446,828,083

(1) Includes condemnation and adjustments for time. Admin costs are not included.

(2) Does not include relocation of telephone equipment and connecting underground lines.

(3) Includes goodwill costs.

Source: Transbay Transit Center Program Management/Program Controls Consultant, October 2010

TRANSBAY JOINT POWERS AUTHORITY
TRANSBAY PROGRAM MANAGERS

Meeting Minutes

Project [300] - Downtown Extension Project

View Date 10/12/2010
Date 8/27/2010

PMPC
201 Mission Street, Suite 2750
San Francisco, CA 94105
Phone: 415-343-2460
Fax: 415-947-0603

Meeting No. DTX-Caltrain-CHSRA-6

Meeting Type	Coordination	**Date**	8/27/2010
Subject	TTC Platform Layout Discussion	**Time**	9:00 AM PT
Prepared By	Meghan Murphy	**Location**	201 Mission Street, Suite 2100

Meeting Attendance

Company - Attendee	Required	Attended	Company - Attendee	Required	Attended
Adamson Associates, Inc. (AAI) - George Metzger	☑	☑	PCJPB (Caltrain) - Robert Doty	☑	☐
Adamson Associates, Inc. (AAI) - Paul MacPhail	☑	☑	PCJPB (Caltrain) - Will Hastings	☑	☐
Adamson Associates, Inc. (AAI) - Sandor Rott	☑	☑	Pelli Clarke Pelli Architects, Inc. (PCPA) - Heather Kim	☑	☑
Arup - Rich Coffin	☑	☑	Pelli Clarke Pelli Architects, Inc. (PCPA) - Randy Volenec	☑	☑
Arup - Tony Bruzzone	☑	☑	PMPC - Alfred Lau	☑	☑
CHSRA PMT - Dominic Spaethling	☑	☑	PMPC - Bradford Townsend	☑	☑
CHSRA PMT - Johnny Kuo	☑	☑	PMPC - Derek Penrice	☑	☑
Emilio Cruz - Emilio Cruz	☑	☑	PMPC - Gerry MacClelland	☑	☐
Parsons (PTG) - Carl Wood	☑	☑	PMPC - Mark O'Dell	☑	☑
Parsons (PTG) - Chukwuma Umolu	☑	☑	PMPC - Meghan Murphy	☑	☑
Parsons (PTG) - Larry Godbold	☑	☑	Thornton Tomasetti - Albert Chen	☑	☑
Parsons (PTG) - Robert Sergeant	☑	☑	TJPA - Brian Dykes	☑	☑
PCJPB (Caltrain) - Claude Gratianne	☑	☑	TJPA - Robert Beck	☑	☑
PCJPB (Caltrain) - Michelle Bouchard	☑	☐	TranSystems Corporation - Emmanuel S. ("Bruce") Horowitz	☑	☐

001 **Introduction**

The TJPA provided an update on the Program schedule and contractual obligations.

- Currently two packages out to bid for the Transit Center (TC).

- The bus ramps are in the demolition phase.

- There is a need to finalize the TC layout so that the design can be completed.

- A trainbox outline based on a 650-feet radii curve into the TC was previous agreed to by CSHRA and Caltrain.

- The final design for the TC is underway with 50% Construction Documents to be submitted by the end of 2010.

- It would be desirable to have a final addendum by the end of September.

002 **Architectural Design**

See meeting handout for discussion points on the architectural design and pedestrian circulation. See attached floor plans, elevation, structural girder plan, and pedestrian flow figures for reference.

Additional notes to the handouts:

- Re-planning Elements: The trainbox extends to the east side of Main Street, however, the concourse level will stop where indicated on the drawings to provide for a utility corridor in Main Street.

- Pedestrian Circulation: There are three primary points of entry to the TC: Shaw Alley, the Grand Hall and Beale Street. Percentage of patrons utilizing each entrance is shown on the figures. Option 2B requires all escalators to be positioned east of the Grand Hall. Five escalators are required to meet pedestrian circulation requirements at peak hours. CHSRA PMT noted a concern related to the location of the escalators to the CHSRA platforms. The TC architectural team is aware of the lack of visibility of these escalators as well as the potential need for fare gates, and will work with the CHSRA team to produce a workable solution.

003 **Rail Operations**

See meeting handout for discussion points on the rail operations. See attached exhibit 1 showing the four layout options analyzed for rail operations for reference.

Additional notes to the handouts:

- Rail Operations Performed Under Stress Conditions for Capacity:

* The DTX Team used 7 CHSRA trains and 6 Caltrain trains per hour as the basis for the evaluation. This was recommended by Caltrain in previous discussions instead of running analyses for the operator's anticipated trains per hour as it more clearly defines how the system will fail and what the limits are.

* The DTX Team analyzed both island and side platform layouts for the Fourth and Townsend Station (See Layouts 3 and 4) and did not find an appreciable difference in the time for the operations. The DTX Team's analyses included Caltrain stopping at the Fourth

and Townsend Station both inbound and outbound from the TC to add stress to the system. The DTX Team does not believe the changes to the location of the platforms at the Fourth and Townsend Station would impact the results of the operations analysis at the TC.

* CHSRA PMT is currently assuming that the approach to the Fourth and Townsend Station will be in a cut-and-cover two-track structure under Seventh Street.

* The DTX Team discouraged the use of curved cross-overs for regular operations as they require significantly more maintenance and custom parts. Curved turnout bodies are longer and require additional machines and switch rods. These would be long lead items to replace so additional spare parts would be needed to be kept in inventory. Caltrain stated that this is normal practice. It was agreed that a curved diamond crossing is not desirable. The DTX Team also noted the need for noise mitigation for the "screeching" sound as the trains use the curves/cross-overs in the TC. This mitigation will likely involve custom pads which will be on a curve and will require additional maintenance.

* Current dwell times: CHSRA: Scheduled dwell time of 26 to 33 minutes with a minimum of 20 minutes. Caltrain: Scheduled dwell time of 20 minutes with a minimum of 15 minutes. No disagreement was voiced during the meeting to these assumed dwell times.

004 **Summary**

- Moving the Caltrain platform to the north side of the TC and using a radius of 650 feet is acceptable to CHSRA and Caltrain. CHSRA hand delivered a letter to the TJPA stating it's agreement. The PMPC asked that Caltrain do the same which Caltrain agreed to.

- Caltrain desires the parallel move flexibility that is provided by Layout 2.

- The TJPA and their design consultants have concerns about the Layout 2 option (particularly if a double cross-over is utilized as it relates to the necessity for a structural arch or other framing methods which would add to the project costs as well as significantly affecting the vertical circulation through the TC. It is the PMPC's view that Layout 2 provides flexibility under adverse conditions, but is not necessary for normal operations and may otherwise be accomplished through other established emergency response procedures.

- Caltrain would like for the TJPA's design consultants to determine the extra length of platform required to accommodate a stair in the shorter platform layout. Caltrain would also like the consultants to determine the structural requirements and cost implications of a hybrid layout option which would combine the operational flexibility of Layout 2 while not overly compromising the vertical circulation benefits of the longer platform.

- Next meeting to be held on 9/3/10 at 9 am to review the further architectural and structural assessment of the hybrid option. The DTX Team will coordinate internally.

All meeting minutes are considered to be correct and accurate unless the author is notified in writing within five (5) business days.

Linked Documents

Document Type	Document	Open	Description	Date	Size (KB)
Doc	300-00235		2010-08-26 Caltrain Ped Circ Figures	8/27/2010	941.94
Doc	300-00236		SKA-1024	8/27/2010	169.55
Doc	300-00237		SKA-1025	8/27/2010	272.23
Doc	300-00238		SKA-1026	8/27/2010	1710.07
Doc	300-00239		SKA-1030	8/27/2010	235.14
Doc	300-00240		For Webex Parsons	8/27/2010	411.28
Doc	300-00241		SSK-42 Config 2B	8/27/2010	685.89
Doc	300-00242		Meeting Handout Bullets-Rev02	8/27/2010	118.50

Distribution

Recipient	Company	Method	Date
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Bradford Townsend	PMPC	Message	8/30/2010
Bradford Townsend	PMPC	Email: btownsend@transbaycenter.org	8/30/2010
Brian Dykes	TJPA	Message	8/30/2010
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Chukwuma Umolu	Parsons (PTG)	Message	8/30/2010
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Paul MacPhail	Adamson Associates, Inc. (AAI)	Message	8/30/2010

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Randy Volenec	Pelli Clarke Pelli Architects, Inc. (PCPA)	Message	8/30/2010
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PB-TJPA-1127

August 27, 2010

Mr. Brian Dykes
Principal Engineer
Transbay Joint Powers Authority
201 Mission Street, Suite 2100
San Francisco, CA 94105

RE: California High-Speed Rail Program Management
Comments to SF Downtown Rail Extension
High Speed Rail Accommodation Study, July 16 2010

Dear Brian:

The CHSRA PMT has reviewed the Transbay Transit Center platform configuration study to accommodate high-speed rail, dated July 16, 2010. This is an updated configuration from the version that was reviewed in March 2010. This concept differs in that the high-speed train platforms switched locations with the Caltrain platform, and are now located on the southern side of the train box serving tracks 21 through 24, in order to not require possible changes to the foundation of 201 Mission Street. Generally, the geometric features are consistent with the March 2010 version, except for the length of platform tapers. While the California High Speed Rail Authority Program Management Team (CHSRA PMT) team did not conduct a comprehensive review of proposed station configuration and alignment, they were able to focus on the following major components of the design:

- Horizontal curve radii
- Approach alignment
- Distance required for the end stop
- Platform length
- Platform gaps

Below is a summary of the initial findings by the CHSRA PMT.

Horizontal Radius

The horizontal radius of 650-foot is commensurate with the tightest radii (622-foot / 190 m) that the EMT has found in revenue service at Cologne Central Station. This will require a design variance for it to be accepted as part of the HST system.

Approach Alignment

The alignment does not provide length of tangent track (75 foot) on either side of platform needed to ensure swing of the cars do not require a tapered platform. In the absence of the tangent, we assessed that platform tapers are required. This will require a design variance.

End Stop

In the absence of a detailed design, the 40 foot length of track allows for 30 feet inclusive of physical 'bumper' requirements plus a 10 foot distance from normal train parking position for end stop requirements. This 40 foot total distance would require a 3-5 mph operational speed.

Platform length

Platforms (Tracks 21, 22, 23, 24) do not meet the exceptional design criteria tangent useable length of 1315 feet. The 1355 feet total length shown includes 40 feet for the end stop, and platform tapers ranging from 60 to

110 feet in length. These platform lengths do not provide for the TSI (European Technical Specifications for Interoperability) tolerance that permits train length to be increased 1% for aerodynamic design. A design variance will be required for the total usable length of the platforms.

Platform Gap

Platforms on tracks 21, 22, 23, and 24 will require additional offsets due to the adjacent or proximate curves in the platform tracks. The beginning point of the need for additional car to platform clearance is based on the point at which the swing in the car body begins due to curvature, which is based on vehicle characteristics.

Since the CHSRA has not selected its vehicle type for the system, the PMT tested the vehicle / platform interface with the Shinkansen trainset technology, assuming it is the most conservative of the compatible vehicles. The acceptable gap between the vehicle and platform is governed by two requirements:

- *Americans with Disabilities Act (ADA)* requires a maximum gap between platform and side of the train at door positions of 3 inches.
- *CHSRA PMT Design Criteria* - The design gap between platform and side of train will be 2.75 inches at the car floor level.

For the Shinkansen equipment, as a typical case, with a 2.75 inch standard offset, the platform tapers and gaps are described in Table 1. For comparison, the March version has also been included.

Table 1: Comparison of Transbay Transit Center HST Platforms Configurations

Track No.	March 2010 Version		July 2010 Version	
	Platform Taper	Max Platform Gap	Platform Taper	Max Platform Gap
	(Feet)	(Total Inches)	(Feet)	(Total Inches)
21	Caltrain		110	10.52
22	Caltrain		95	10.29
23	82.5	10.08	95	10.36
24	108.9	6.66	60	5.87
25	56.5	4.67	Caltrain	
26	29.1	3.70	Caltrain	

Overall, moving the HST to platforms 21 to 24 results in longer areas of platform gap than what was previously proposed in March. In both cases a design variance would be required for the potential platform gap issues.

In addition to the observations outlined above, the EMT would also need to confirm:

- Width of platform to be at least 30 feet
- Distance between face of platform and track centerline to be 5.75 feet
- Superelevation assumptions for the alignment
- Full approach with trackwork for consistency with the operational requirements
- Suitability of operational mitigations (platform gap fillers, wheel lubrication devices, etc)
- Acquisition of Phase 2 right of way
- Design of the downtown extension (DTX) beyond the TTC footprint

In conclusion, while the current design (July 16, 2010) for the Transbay Transit Center would require a series of design variances in order for it to be acceptable for the HST system, the project, as currently described, should

accommodate the anticipated high-speed trainsets at the TTC. The appropriate next step would be to enter into a formal design variance process whereby the CHSRA and the TJPA can discuss the possible operational, design or other mitigations for the issues with the horizontal radius, approach alignment, platform length and platform gap. Finally, this terminal concept is only feasible if both Phase I and II as outlined in the plan set of July 16, 2010 are constructed before the initiation of service to the terminal. The Phase I construction alone would not be sufficient to accommodate the HST forecasted level of service.

I look forward to working with you on developing solutions for the design issues identified above. Please do not hesitate to contact me with questions regarding this letter.

Sincerely,

Dominic Spaethling
Regional Manager
CHSRA PMT

cc Ken Jong
Johnny Kuo
Derek Penrice

1011851

Appendix B
Item b (2)

CALIFORNIA HIGH-SPEED RAIL AUTHORITY

Caltrain

PRP-1670-LTO-DTX-002

CIN			File Code		
Project: PW DTX TC BS BR S&U TT ET PMPC					
CW Module: ☒ Concep. ☐ FD ☐ Contracts ☐ Drawing ☐ Permits ☐ Other					
Name	Info	Action	Name	Info	Action
Emilio	☑	☐	Phil/ Guy/ Wil	☐	☐
Steve	☐	☐	Judy/Karen	☐	☐
Jim	☐	☐	Prasad	☐	☐
Joyce / Derrick	☐	☐	Jason P/ Jason R	☐	☐
Doug	☐	☐	Jimmy	☐	☐
Alfred / Mark	☑	☐	Whitney	☐	☐
Brad/Derek/Meghan	☑	☐		☐	☐

September 29, 2010

Brian Dykes
Transbay Joint Powers Authority
201 Mission Street
Suite 2100
San Francisco, Ca. 94105

RECEIVED SEP 30 2010

Subject: Transbay Center Train Level Configuration Approval

Dear Mr. Dykes,

The Peninsula Rail Program wishes to express its appreciation of the TJPA's efforts over the course of the last few months in developing a train platform and track layout suitable for the needs of Caltrain and the CHSRA. The attached exhibit memorializes the agreed general configuration of platforms, tracks and crossovers for the terminal area. Of note, the layout swaps Caltrain from 21/22 to 25/26 to mitigate the property take of 201 Mission Street that would otherwise be required to accommodate the longer length of high speed train platforms.

More specifically, it is understood that the attached exhibit is a preliminary drawing and further design is required to address areas where engineering variances are required. Specific variances required for the CHSR platforms were indicated in a letter by Parsons Brinkerhoff dated August 27th, 2010 (Reference PB-TJPA-1127). In addition, engineering variances will be required by Caltrain for the crossovers required in the curved portion of the terminal approach; the reduced width of platform on Track 25 near the end post; and the tapered end of platform on Track 26- understood to be outside of the usable portion of vehicle berthing.

Reference is also made to a letter received from the TJPA describing concerns on the normal operational use of the two crossovers in the terminal approach curve (Reference Letter dated September 21st, 2010). The PRP expects that a formal submittal will be made to Caltrain of specific engineering variances required of these crossovers. Caltrain will review the variance requests and determine if any restrictions are required due to the unique configuration.

Please do not hesitate to contact me if there are any questions or concerns regarding this letter.

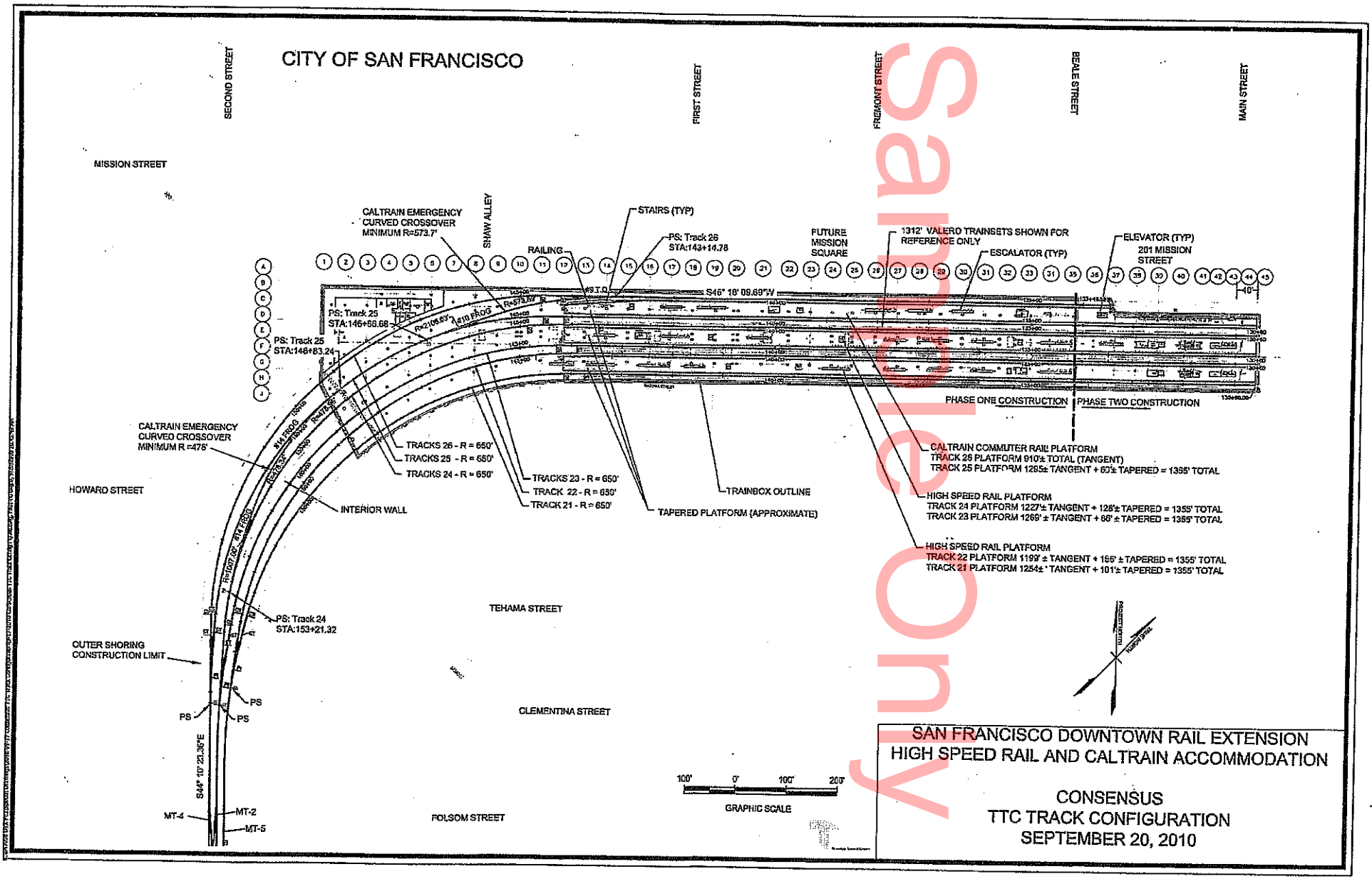
Sincerely,

Claude Gratianne, P.E.
Peninsula Rail Program

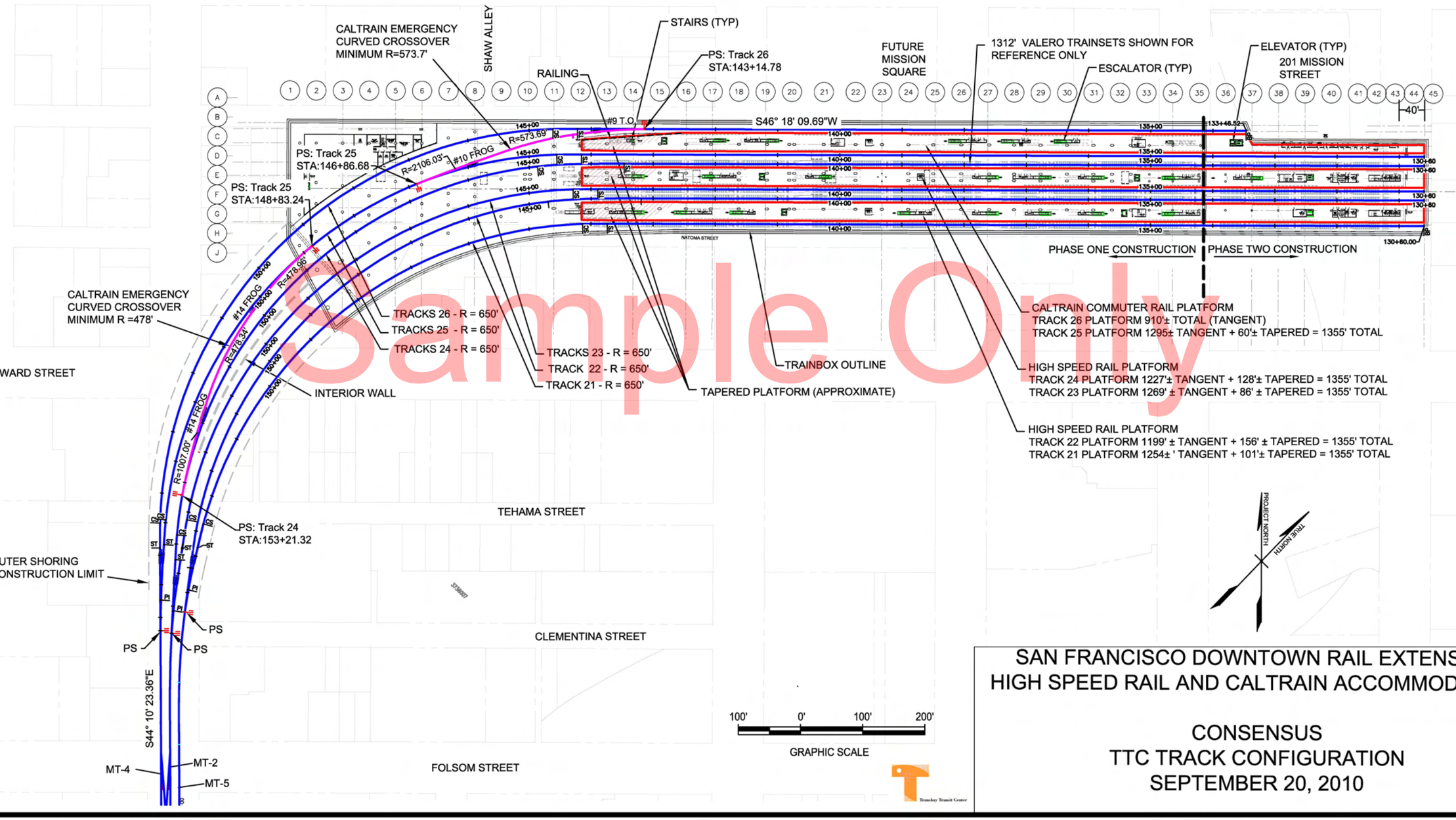
CC: Bob Doty, Michelle Bouchard, Doc. Control

Enc: TTC Track Configuration Drawing, dated September 20th 2010

PENINSULA RAIL PROGRAM
799 Seventh Street
San Francisco, CA 94107

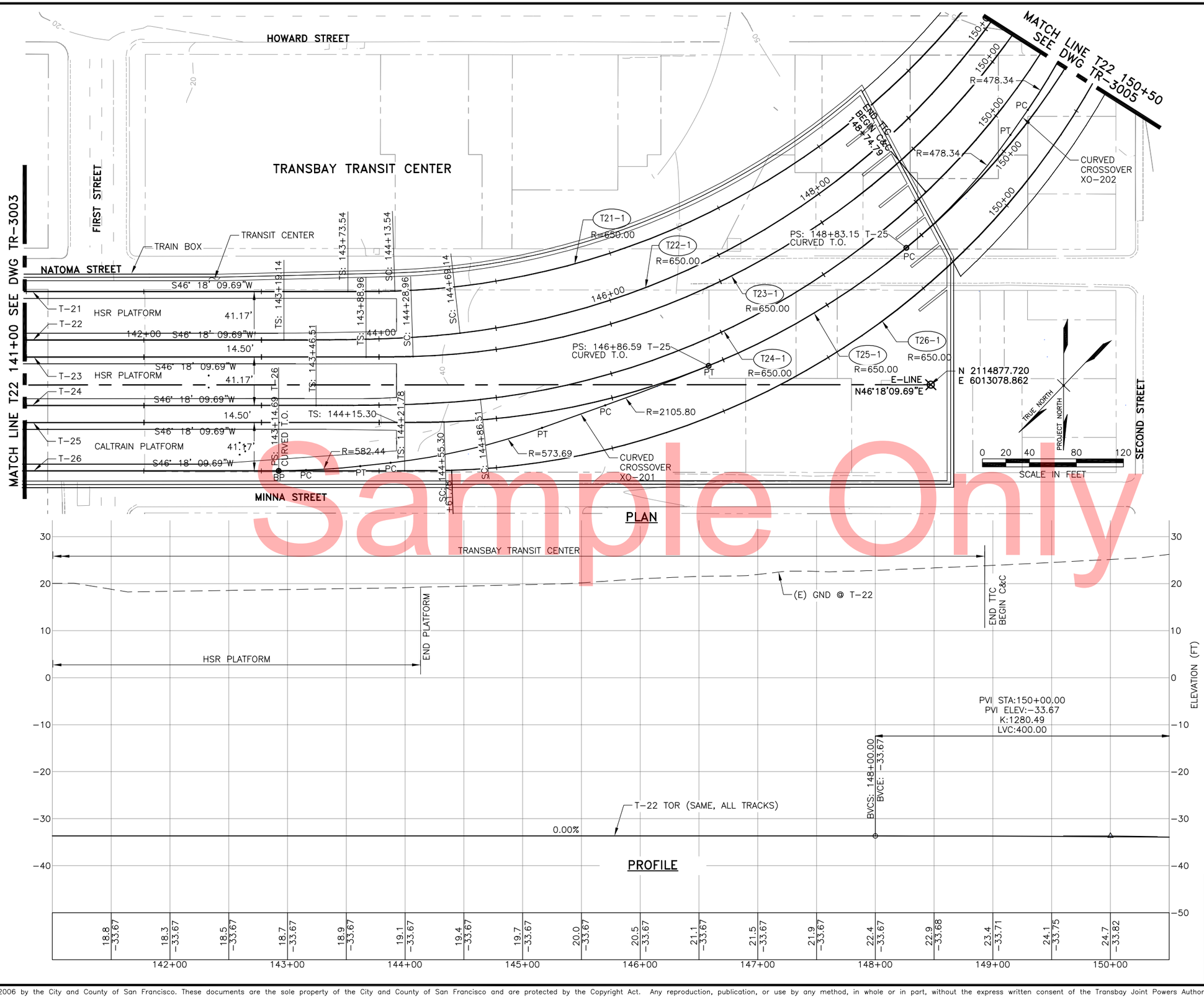

CITY OF SAN FRANCISCO
SECOND STREET
FIRST STREET
FREMONT STREET
BEALE STREET
MAIN STREET
MISSION STREET
SHAW ALLEY
FUTURE MISSION SQUARE
CALTRAIN EMERGENCY CURVED CROSSOVER MINIMUM R=573.7'
STAIRS (TYP)
RAILING
PS: Track 26 STA:143+14.78
1312' VALERO TRAINSETS SHOWN FOR REFERENCE ONLY
ESCALATOR (TYP)
ELEVATOR (TYP) 201 MISSION STREET
S46° 16' 09.69"W
PS: Track 25 STA:146+66.66
PS: Track 25 STA:146+83.24
PHASE ONE CONSTRUCTION
PHASE TWO CONSTRUCTION
CALTRAIN EMERGENCY CURVED CROSSOVER MINIMUM R=478'
HOWARD STREET
TRACKS 26 - R = 650'
TRACKS 25 - R = 650'
TRACKS 24 - R = 650'
TRACKS 23 - R = 650'
TRACK 22 - R = 650'
TRACK 21 - R = 650'
INTERIOR WALL
TRAINBOX OUTLINE
TAPERED PLATFORM (APPROXIMATE)
CALTRAIN COMMUTER RAIL PLATFORM
TRACK 26 PLATFORM 910± TOTAL (TANGENT)
TRACK 25 PLATFORM 1295± TANGENT + 60± TAPERED = 1355' TOTAL
HIGH SPEED RAIL PLATFORM
TRACK 24 PLATFORM 1227'± TANGENT + 128'± TAPERED = 1355' TOTAL
TRACK 23 PLATFORM 1269' ± TANGENT + 68' ± TAPERED = 1355' TOTAL
HIGH SPEED RAIL PLATFORM
TRACK 22 PLATFORM 1199' ± TANGENT + 156' ± TAPERED = 1355' TOTAL
TRACK 21 PLATFORM 1254± ' TANGENT + 101'± TAPERED = 1355' TOTAL
TEHAMA STREET
PS: Track 24 STA:153+21.32
OUTER SHORING CONSTRUCTION LIMIT
PS
CLEMENTINA STREET
S44° 10' 23.36"E
MT-4
MT-2
MT-5
FOLSOM STREET
100' 0' 100' 200'
GRAPHIC SCALE
SAN FRANCISCO DOWNTOWN RAIL EXTENSION
HIGH SPEED RAIL AND CALTRAIN ACCOMMODATION
CONSENSUS
TTC TRACK CONFIGURATION
SEPTEMBER 20, 2010

CITY OF SAN FRANCISCO



SAN FRANCISCO DOWNTOWN RAIL EXTENSION
HIGH SPEED RAIL AND CALTRAIN ACCOMMODATION

CONSENSUS
TTC TRACK CONFIGURATION
SEPTEMBER 20, 2010



NOTE:

PLATFORM AND BUILDING OUTLINE DIMENSIONS TO BE REFINED BY TRANSIT CENTER ARCHITECT.

Transbay Transit Center

TRANSBAY JOINT POWERS AUTHORITY

CONSULTANT:
PARSONS
50 FREMONT STREET
SUITE 1500
SAN FRANCISCO, CA 94105

Key Map

NO.	DATE	DESCRIPTION	BY
1	07-16-10	PRELIMINARY ENGINEERING PLANS	CU
2	01-14-11	UPDATE TO ACCOMMODATE HIGH SPEED RAIL	

REVISIONS

CONTRACT NO. 03-02-DTX ENGR-001

PROJECT TITLE
TRANSBAY TRANSIT CENTER PROGRAM
CALTRAIN DOWNTOWN EXTENSION
SAN FRANCISCO, CA

SHEET TITLE
TRACK PLAN AND PROFILE
STA 141+00 TO STA 150+50
SHEET 2 OF 11

ARCHITECT/ENGINEER SEAL

APPROVED: R. SERGEANT
PRINCIPAL ENGINEER / ARCHITECT
APPROVED: R. SERGEANT
PROJECT MANAGER
APPROVED: C. UMOLU
PROJECT ENGINEER / ARCHITECT

DESIGNED BY:	CHECKED BY:
L.GODBOLD, D.LIU	P. CHU
DRAWN BY:	DATE:
D. LIU	01-14-2011
SCALE: 1"=40'H; 1"=10'V	FACILITY NO. 300 / REVISION
SHEET NUMBER TR-3004	SEQUENCE NUMBER 74 of 465

PRELIMINARY ENGINEERING PLANS

XREFS: xsvtopo46.dwg\ xsvtopo45.dwg\ xsvtopo44.dwg\ xsvtopo43.dwg\ xsvtopo42.dwg\ xsvtopo41.dwg\ xsvtopo40.dwg\ xsvtopo4c.dwg\ xsvtopo4b.dwg\ xsvtopo4a.dwg\ xsvrowex.dwg\ TJPA-TB_22x34D.dwg\ xsstatpln.dwg\ XTRATSEND.dwg\ XSPLNPAR.dwg\ XTRTRACK.dwg\ XTRSTNAME.dwg\ XSVSFDFWY.dwg\ XTRPLAT.dwg\ XSFLRB2PH1-DECIMAL.dwg\ XSFLRB2PH2-DECIMAL.dwg\ _DTX _Recommended.dwg
Jan 12, 2011 - 7:17pm R:\64705B DTX PEC\PE Drawings\Sheets-Track\TR-3003 thru TR-3010.dwg